

IN THE CLAIMS:

1.-13. (Cancelled)

14. (New) A rotary piston device comprising:
a shaft to rotate about a longitudinal axis;
a rotor centrally secured to the shaft, the rotor having a body with a cylindrical surface extending between spaced ends;
a rotor disk secured at each end of the rotor and secured at a centre of the rotor disk to the shaft;
a housing encasing the shaft, the rotor and the rotor disks within an internal cavity, the shaft extending outside of the housing, the housing having interior end walls adjacent to the rotor disks and an interior sidewall, with fluid inlet and fluid outlet ports in the interior sidewall, a first portion of the interior sidewall of the housing being cylindrical and curved with a constant radius over an angle of about approximately 180°, the first portion being spaced a constant distance from confronting portions of the cylindrical surface of the rotor, and a second portion of the interior sidewall of the housing extending between the extremities of the first portion of the interior sidewall, and a curvature of the second portion having a greater radius than a curvature of the first portion;
the cylindrical surface of the rotor being proximal to the interior sidewall of the housing at a point between the fluid inlet and fluid outlet ports about midway along the second portion, the fluid inlet and fluid outlet ports being located in this second portion of the interior sidewall of the housing;
at least three equally spaced, radially oriented slots in the rotor longitudinally extending across the cylindrical surface of the rotor body;
at least three similar vanes, each vane having internal and external edges extending between sides, each vane slidably seated in one of said slots, each vane movable radially in the corresponding slot between an extended position with the external edge of the vane adjacent the interior sidewall of the housing, and a retracted position wherein the external edge of the vane does not extend beyond the cylindrical surface of the rotor, the vanes being spaced from adjacent vanes about the rotor such that there is always at least one vane positioned between the fluid inlet and fluid outlet ports;

an ear extending beyond the external edge of each vane at each of the vane sides and a pin secured to each ear and extending inwardly towards the vane's other ear, the pin of each ear seated in one of a pair of races continuously extending in portions of the interior sidewall of the housing, the races circumscribing the shaft and formed so as to provide proper extending and retracting movement of the vanes as the pins move along the races as the rotor rotates; and

a plurality of slots in the rotor disks aligned with the rotor slots and slidably receiving the sides of the vanes and the corresponding ears,

the rotor disks, the housing and the vanes constructed so that, during operation of the rotary piston, fluid entering the housing through the inlet port is carried by the rotor, in each of compartments formed between adjacent vanes, the rotor surface between the vanes, the rotor disks and the corresponding portions of the end walls and interior sidewall of the housing, until the adjacent vanes encompass the outlet port whereby the fluid is allowed to leave the housing.

15. (New) The rotary piston device according to claim 14, wherein the rotor is provided with four slots, and one of said vanes slidably seated within each slot of the rotor.

16. (New) The rotary piston device according to claim 14, wherein at least one aperture is provided in each vane, said at least one aperture extending from the external edge to the internal edge of the corresponding vane.

17. (New) The rotary piston device according to claim 16, wherein the external edge of each vane is provided with an external vane seal extending along the external edge, from side to side of the vane, the external vane seal constructed so as to permit a fluid passage from the compartment on one side of the vane to the bottom of the corresponding slot, below the vane, to assist in outward movement of the vane and holding the vane in said extended position while restricting flow of the fluid from said compartment to the compartment on the other side of the vane.

18. (New) The rotary piston device according to claim 17, wherein each external vane seal is movable in a pocket extending along the external edge of the corresponding vane, between first and second positions on the end of the vane so as to provide the fluid passage through said at least one aperture in the corresponding vane from one adjacent compartment when the external vane seal is in said first position and from the other adjacent compartment when the external vane seal is in said second position.

19. (New) The rotary piston device according to claim 17, wherein the external vane seal is made of brass.

20. (New) The rotary piston device according to claim 14, wherein at least one aperture through one of said rotor disks is provided in each quadrant between adjacent slots, and fluid seals are provided on either side of each of said apertures between the corresponding rotor disk and the corresponding interior end wall of the housing.

21. (New) The rotary piston device according to claim 20, wherein a reef valve is provided in each of said apertures through said rotor disk to assist in maintaining positive pressure between the corresponding rotor disk and the housing.

22. (New) The rotary piston device according to claim 20, wherein said seals are in the form of piston seals, whereby increased fluid pressure on the piston seals causes expansion of sides of the piston seals to enhance resistance to passage of fluid past the piston seals.

23. (New) The rotary piston device according to claim 20, wherein a continuous seal is provided between an interior surface of each rotor disk and a portion of the interior sidewall of the housing in which the race is provided, so as to assist in maintaining fluid pressure within the corresponding compartment.

24. (New) The rotary piston device according to claim 14, wherein the shaft, rotor and rotor disks are of integral construction.

25. (New) A rotary piston device comprising:

- a shaft to rotate about a longitudinal axis;
- a rotor centrally secured to the shaft, the rotor having a body with a cylindrical surface extending between spaced ends;
- a rotor disk at each end of the rotor secured to the rotor and secured at a centre of the rotor disk to the shaft;
- a housing encasing the shaft, the rotor and the rotor disk within an internal cavity, the shaft extending outside of the housing, the housing having interior end walls adjacent to the rotor disks and an interior sidewall, with fluid inlet and fluid outlet ports in the interior sidewall, a first portion of the interior sidewall of the housing being cylindrical and curved with a constant radius over an angle of about approximately 180°, the first portion being spaced a constant distance from confronting portions of the cylindrical surface of the rotor, and a second portion of the interior sidewall of the housing continuing from the extremities of the first portion of the interior sidewall, and a curvature of the second portion having a greater radius than a curvature of the first portion, the cylindrical surface of the rotor being proximal to the interior sidewall of the housing at a point between the fluid inlet and fluid outlet ports about midway along the second portion, the fluid inlet and fluid outlet ports being located in this second portion of the interior sidewall of the housing;
- at least three equally spaced, radially oriented slots in the rotor extending across the cylindrical surface of the rotor body;
- at least three similar vanes, each vane having internal and external edges extending between sides, each vane slidably seated in one of said slots, each vane movable radially in the corresponding slot between an extended position with the external edge of the vane adjacent the interior sidewall of the housing, and a retracted position wherein the external edge of the vane does not extend beyond the cylindrical surface of the rotor, the vanes being spaced from adjacent vanes about the rotor such that there is always at least one vane positioned between the fluid inlet and fluid outlet ports;
- an ear extending beyond the external edge of each vane at each of the vane sides and a pin secured to each ear and extending inwardly towards the other ear of the vane, the pin of each ear seated in a race continuously extending in a portion of the interior sidewall of the

housing, the race circumscribing the shaft and formed so as to provide proper extending and retracting movement of the vanes as the pins move along the races as the rotor rotates;

a plurality of slots in the rotor disks aligned with the rotor slots and slidably receiving the sides of the vanes and the corresponding ears;

the rotor disks, the housing and the vanes constructed so that, during operation of the rotary piston, fluid entering the housing through the inlet port is being carried by the rotor, in each of compartments formed between adjacent vanes, the rotor surface between the vanes, the rotor disks and the corresponding portions of the end walls and interior sidewall of the housing, until the adjacent vanes encompass the outlet port whereby the fluid is allowed to leave the housing;

at least one aperture is provided in each vane; said at least one aperture extending from the external edge to the internal edge of the corresponding vane, the external edge of each vane being provided with an external vane seal extending along the external edge, from side to side of the vane, the external vane seal constructed so as to permit fluid a passage from the compartment on one side of the vane to the bottom of the corresponding slot, below the vane, to assist in outward movement of the vane and holding the vane in said extended position while restricting flow of the fluid from said compartment to the compartment on the other side of the vane;

each external vane seal being movable in a pocket extending along the external edge of the corresponding vane, between first and second positions on the end of the vane so as to provide the fluid passage through said at least one aperture in the corresponding vane from one adjacent compartment when the external vane seal is in said first position and from the other adjacent compartment when the seal is in said second position; and

at least one aperture through one of said rotor disks is provided in each quadrant between adjacent slots and fluids seals are provided on either side of each of said aperture between the corresponding rotor disk and the corresponding interior end of the wall of the housing.